PROCEEDINGS
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1839. No. 37.

February 14, 1839.

JOHN W. LUBBOCK, Esq., V.P. and Treas., in the Chair.

The Right Honourable Lord Carrington, was balloted for, and duly elected into the Society.

A paper was read, entitled, "Researches on the Chemical Equivalents of certain Bodies." By Richard Phillips, Esq., F.R.S.

The author examines, by a new series of experiments, the truth of the theory of Dr. Prout and Dr. Thomson, namely, that "all atomic weights are simple multiples of that of hydrogen," a theory which the late Dr. Turner had maintained is at variance with the most exact analytic researches, and consequently untenable. Although the experiments of Dr. Turner, and the inferences which he drew from them, agree very nearly with those of Berzelius, it still appeared to the author desirable to investigate this subject; and it occurred to him that the inquiry might be conducted in a mode not liable to some of the objections which might be urged against the processes usually employed.

Dr. Turner having adopted a whole number, namely 108, as the equivalent of silver, this substance was selected by the author as the basis of his inquiry into the equivalent numbers of chlorine, and some other elementary gases. It appeared to him that the chance of error arising from the fusing of the chloride of silver might be entirely removed, and other advantages gained, by experimenting on silver on a large scale, with such proportions of the substances employed as were deemed to be equivalents; and instead of calculating from the whole product of the fused chloride, to do it merely from the weight of such small portion only, as might arise from the difference between theoretical views and experimental results.

The author concludes, from the train of reasoning he applies to the series of experiments so undertaken, that no material, and even scarcely any appreciable error can arise from considering the equivalent numbers of hydrogen, oxygen, azote, and chlorine, as being 1, 8, 14, and 36 respectively.

A paper was also read, entitled, "Some Account of the Hurricane of the 7th of January, 1839, as it was experienced in the neighbourhood of Dumfries," in a letter addressed to P. M. Roget, M.D. Secretary to the Royal Society. By P. Garden, Esq. Communicated by Dr. Roget.

After describing the position of his house, and the nature of the instruments employed for observation, the writer gives his observations of the barometer and thermometer on the 6th and 7th of January last, and proceeds to state, that on the 6th, at about ten minutes past ten o'clock p.m. violent squalls commenced, at first with intermissions of perfect calms, but gradually becoming more frequent, and being accompanied by the sound of strong and increasing whirlwinds. By eleven o'clock the wind was observed to proceed from the East, and its velocity was estimated at forty miles an hour. Its violence then increased, and threatened to blow down the chimneys. At midnight it abated, at the same time shifting to the south or west. At two o'clock in the morning nearly two tons of lead were torn away by the wind from the west end platform on the house-top, and thrown down behind the house in a westerly direction. Some of the lower windows having been left a little open, the wind thus admitted into the house forced up and blew off the very heavy hatch-door of the roof, which was covered with lead. The whole house rocked terribly, and even the stone floor of the half-sunk kitchen story heaved as if shaken by an earthquake: the slates from the roof were blown in every direction, some being carried to a prodigious distance. During the greater part of the night the rain fell in tremendous torrents. In the interval from two to half-past three in the morning, the barometer sunk very nearly an inch and a half, and reached its greatest depression. But the tempest continued till about four o'clock, when it began gradually to subside. Extensive devastation occurred among the trees; some that were blown down raising two or three tons of clay soil with the roots. Several trees thus thrown down fell with their tops to the W.N.W.

The writer concludes from these and other observations, that the first and squally part of the storm began from the E.S.E., and blew from S. by W. at about midnight; and that most injury was done to the slating and roof when the wind was not far from the south. It then gradually veered to the west, till noon, and reached the N.W. point by eight o'clock in the evening of the same day.

February 21, 1839.

JOHN GEORGE CHILDREN, Esq., V.P., in the Chair.

Captain Arthur Conolly and Lieut.-Colonel William Reid, C.B., R.E., were balloted for, and duly elected into the Society.

A paper was read, entitled, "An Account of the Processes employed in Photogenic Drawing," in a letter to S. Hunter Christie, Esq., Sec. R.S. By H. Fox Talbot, Esq., F.R.S.

The subject, Mr. Talbot observes, naturally divides itself into two heads,—the preparation of the paper, and the means of fixing the design.

In order to make what may be called ordinary Photogenic paper, the author selects, in the first place, paper of a good firm quality and smooth surface; and thinks that none answers better than superfine writing paper. He dips it into a *weak* solution of common salt, and wipes it dry, by which the salt is uniformly distributed throughout its substance. He then spreads a solution of nitrate of silver on one surface only, and dries it at the fire. The solution should not be saturated, but six or eight times diluted with water. When dry, the paper is fit for use. He has found by experiment that there is a certain proportion between the quantity of salt and that of the solution of silver which answers best, and gives the maximum effect. If the strength of the salt is augmented beyond this point, the effect diminishes, and in certain cases becomes exceedingly small. This paper, if properly made, is very useful for all ordinary photogenic purposes. For example, nothing can be more perfect than the images it gives of leaves and flowers, especially with a summer sun. The light passing through the leaves delineates every ramification of their nerves. If a sheet of paper thus prepared, be taken and washed with a *saturated* solution of salt, and then dried, it will be found (especially if the paper has been kept some weeks before the trial is made) that its sensibility is greatly diminished, and in some cases seems quite extinct. But if it be again washed with a liberal quantity of the solution of silver, it becomes again sensible to light, and even more so than it was at first. In this way, by alternately washing the paper with salt and silver, and drying it between times, Mr. Talbot has succeeded in increasing its sensibility to the degree that is requisite for receiving the images of the camera obscura. In conducting this operation it will be found that the results are sometimes more and sometimes less satisfactory in consequence of small and accidental variations in the proportions employed. It happens sometimes that the chloride of silver is disposed to darken of itself without any exposure to the light: this shows that the attempt to give it sensibility has been carried too far. The object is, to *approach* to this condition as near as possible, without *reaching* it, so that the substance may be in a state ready to yield to the slightest extraneous force, such as the feeble impact of the violet rays when much attenuated. Having therefore prepared a number of sheets of paper slightly different from one another in the composition, let a piece be cut from each, and having been duly marked or numbered, let them be placed side by side in a very weak diffused light for about a quarter of an hour. Then, if any one of them, as frequently happens, exhibits a marked advantage over its competitors, Mr. Talbot selects the paper which bears the corresponding number, to be placed in the camera obscura.

With regard to the second object, that of fixing the images, Mr. Talbot observed that after having tried *ammonia* and several other reagents, with very imperfect success, the first which gave him a successful result was the iodide of potassium much diluted with water. If a photogenic picture is washed over with this liquid, an *iodide of silver* is formed, which is absolutely unalterable by sunshine. This process requires precaution; for, if the solution is too strong, it attacks the dark parts of the picture. It is requisite therefore to find by trial the proper proportions. The fixation of the pictures in this way, with proper management, is very beautiful and lasting. The specimen of *lace* which Mr. Talbot exhibited to the Society, and which was made five years ago, was preserved in this manner. But his usual method of fixing is different from this, and somewhat simpler, or at least, requiring less nicety. It consists in immersing the picture in a strong solution of *common salt*, and then wiping off the superfluous moisture and drying it. It is sufficiently singular that the same substance which is so useful in *giving* sensibility to the paper, should also be capable, under other circumstances, of *destroying* it, but such is nevertheless the fact. Now, if the picture which has been thus washed and dried, is placed in the sun, the white parts colour themselves of a pale lilac tint; after which they become insensible. Numerous experiments have shown the author, that the depth of this lilac tint varies according to the quantity of salt used relatively to the quantity of silver. But by properly adjusting these, the images may, if desired, be retained of an absolute whiteness. He mentions also, that those preserved by *iodine* are always of a very pale primrose yellow, which has the extraordinary and very remarkable property of turning to a full gaudy yellow whenever it is exposed to the heat of a fire, and recovering its former colour again when it is cold.

A paper was also read, entitled, "A Description of a Hydropneumatic Baroscope." By J. T. Cooper, Esq., Lecturer on Chemistry.

The liability of the ordinary mercurial barometer to derangement and to fracture, led the author to the construction of an instrument for measuring atmospheric pressure that should be exempt from these objections. It consists of a float, formed by a brass tube, having the shape of the frustum of an inverted cone, nine inches long, two inches in diameter above, and one inch below, and its content being about fourteen cubic inches. From the centre of the upper and wider end, which is closed, a brass wire proceeds, surmounted by a cup, for the purpose of holding such weights as are necessary for bringing the float, when immersed in water, to the same constant level. The lower and smaller end of the tube is closed by a brass plug, sufficiently heavy to sink the instrument to the proper depth, and maintain its position, and having a small perforation in its centre. This float is inclosed in a case, containing the water in which it is to be immersed, and which is to be raised to a constant given temperature by a spirit lamp burning beneath it. The float being first filled with water, a given portion of this water is poured out into a measure of known capacity, and is consequently replaced by an equal volume of air, the dilatations or contractions of which will, when the temperature is constant, be dependent only on the external pressure of the atmosphere; and the latter will, therefore, be indicated by the weights requisite to be placed in the cup of the float, in order to maintain it at the same level in the fluid, on the principle of the hydrometer. The author gives a minute description of all the parts of the apparatus, of the method of using it, and of the adjustments and calculations required for determining by its means the difference of level of two stations.

Mr. Darwin's paper, entitled, "On the Parallel Roads of Glen Roy, and other parts of Lochaber, &c.," was resumed, but not concluded.

February 28, 1839.

JOHN WILLIAM LUBBOCK, Esq., V.P. and Treas., in the Chair.

Commander Henry Mangles Denham, R.N., and Richard Drew, Esq., were balloted for, and duly elected into the Society.

The reading of a paper, entitled, "Observations on the Parallel Roads of Glen Roy, and of other parts of Lochaber, with an attempt to prove that they are of Marine Origin." By Charles Darwin, Esq., M.A., F.R.S., Sec. Geological Society, was resumed and concluded.

The author premises a brief description of the parallel roads, shelves, or lines, as they have been indefinitely called, which are most conspicuous in Glen Roy and the neighbouring valleys, referring for more detailed accounts to those given by Sir Thomas Lauder Dick, in the Transactions of the Royal Society of Edinburgh, and by Dr. Macculloch in those of the Geological Society of London. Both these geologists endeavour to explain the formation of these shelves on the hypothesis of their resulting from depositions at the margin of lakes, which had formerly existed at those levels. The author, however, shows that this hypothesis is inadmissible, from the insuperable difficulties opposed to any conceivable mode of the construction and removal, at successive periods, of several barriers of immense size, whether placed at the mouths of the separate glens, or at more distant points. He does not, however, propose the alternative, that the beaches, if not deposited by lakes, must of necessity have been formed by channels of the sea, because he deems it more satisfactory to prove, from independent phenomena, that a sheet of water, gradually subsiding from the height of the upper shelves to the present level of the sea, occupied for long periods not only the glens of Lochaber, but the greater number, if not all the valleys of that part of Scotland; and that this water must have been that of the sea. It is argued by the author, that the fluctuating element must have been the land, from the ascertained fact of the land rising in one part, and at the same time sinking in another; and therefore, that this change of level in Scotland, attested as it is by marine remains being found at considerable heights both on the eastern and western coasts, implies the elevation of the land, and not the subsidence of the surrounding waters. The author next shows, that in all prolonged upward movements of this kind, it might be predicted, both from the analogy of volcanic action, and from the occurrence of lines of escarpment rising one above the other in certain regions, that in the action of the subterranean impulses there would be intervals of rest. On the hypothesis that the land was subjected to these conditions, it appears that its surface would have been modeled in a manner exactly similar, even in its minute details, to the existing structure of the valleys in Lochaber. Considering that he has thus established his theory, the author proceeds to remove the objections which might be urged against its truth, derived from the non-extension of the shelves, and the absence of organic remains at great altitudes. He then shows how various details respecting the structure of the glens of Lochaber, such as the extent of corrosion of the solid rock, the quantity of shingle, the numerous levels at which water must have remained, the forms of the heads of the valley, where the streams divide, and especially their relation with the shelves, and the succession of terraces near the mouth of Glen Spean, are all explicable on the supposition that the valleys had become occupied by arms of a sea which had been subject to tides, and which had gradually subsided during the rising of the land; two conditions which could not be fulfilled in any lake. From the attentive consideration bestowed by the author on these several and independent steps of the argument, he regards the truth of the theory of the marine origin of the parallel roads of Lochaber (a theory, of which the foundation stone may be said to have been laid by the important geological researches of Mr. Lyell, establishing the fact of continents having slowly emerged from beneath the sea) as being sufficiently demonstrated.

The author states, in the concluding part of his paper, the following as being the chief points which receive illustration from the examination of the district of Lochaber by Sir Thomas Lauder Dick, Dr. Macculloch, and himself. It appears that nearly the whole of the water-worn materials in the valleys of this part of Scotland were left, as they now exist, by the slowly retiring waters of the sea; and the principal action of the rivers since that period has been to remove such deposits; and when this had been effected, to excavate a wall-sided gorge in the solid rock. Throughout this entire district, every main, and most of the lesser inequalities of surface are due, primarily to the elevating forces, and, secondarily, to the modeling power of successive beach-lines. The ordinary alluvial action has been exceedingly insignificant; and even moderately sized streams have worn much less deeply into the solid rock than might have been anticipated, during the vast period which must have elapsed since the sea was on a level with the upper shelves: even the steep slopes of turf over large spaces, and the bare surface of certain rocks, having been perfectly preserved during the same lapse of time. The elevation of this part of Scotland to the amount of at least 1278 feet was extremely gradual, and was interrupted by long intervals of rest. It took place either during the so called "erratic block period," or afterwards; and it is probable that the erratic blocks were transported during the quiet formation of the shelves. One of these was found at an altitude of 2200 feet above the present level of the sea. The most extraordinary fact is, that a large tract of country was elevated to a great height, so equably, that the ancient beach-lines retain the same curvature, or nearly so, which they had when forming the margin of the convex surface of the ancient waters.

The inferences drawn by the author from these facts, and which he corroborates by other evidence, are that a large area must have been uplifted, and that its rise was effected by a slight change in the convex form of the fluid matter on which the crust of the earth rests; and therefore that the fluidity of the former is sufficiently perfect to allow of the atoms moving in obedience to the law of gravitation, and consequently, of the operation of that law modified by the centrifugal force: and lastly, that even the disturbing forces do not tend to give to the earth a figure widely different from that of a spheroid in equilibrium.

March 7, 1839.

The MARQUIS of NORTHAMPTON, President, in the Chair.

George Godwin, jun. Esq., and George Gulliver, Esq., were balloted for, and duly elected into the Society.

A paper was read, entitled, "On the Male Organs of some of the Cartilaginous Fishes." By John Davy, M.D., F.R.S., Assistant Inspector of Army Hospitals.

In this paper, which is wholly occupied with anatomical details, the author refers to his paper on the Torpedo, which was published in the Philosophical Transactions for 1834; and also to Müller's work "De Glandularum secernentium structura penitiori," whose descriptions and views are not in accordance with those given in that paper. In the present memoir he adduces evidence of the accuracy of his former statement, chiefly founded on microscopical observations, and offers some conjectures respecting the functions of several organs found in cartilaginous fishes; but does not pretend to attach undue importance to his speculations.

A paper was also read, entitled, "Researches in Physical Geology.—*Third Series.* On the Phenomena of Precession and Nutation, assuming the interior of the earth to be a heterogeneous fluid." By W. Hopkins, Esq., M.A., F.R.S., &c.

Having, in his last memoir, completed the investigation of the amount of precession and nutation, on the hypothesis of the earth's consisting of a homogeneous fluid mass, contained in a homogeneous solid shell, the author here extends the inquiry to the case in which both the interior fluid and external shell are considered as heterogeneous. After giving the details of his analytical investigation, he remarks, that he commenced the inquiry in the expectation that the solution of this problem would lead to results different from those previously obtained on the hypothesis of the earth's entire solidity. This expectation was founded on the great difference existing between the direct action of a force on a solid, and that on a fluid mass, in its tendency to produce a rotatory motion; for, in fact, the disturbing forces of the sun and moon do not tend to produce directly any motion in the interior fluid, in which the rotatory motion causing precession and nutation is produced indirectly by the effect of the same forces on the position of the solid shell. A modification is thus produced in the effects of the centrifugal force, which exactly compensates for the want of any direct effect from the action of the disturbing forces; a compensation which the author considers as scarcely less curious than many others already recognized in the solar system, and by which, amidst many conflicting causes, its harmony and permanence are so beautifully and wonderfully preserved.

The solution of the problem obtained by the author destroys the force of an argument, which might have been urged against the hypothesis of central fluidity, founded on the presumed improbability of our being able to account for the phenomena of precession and nutation on this hypothesis, as satisfactorily as on that of internal solidity. The object, however, of physical researches of this kind is not merely to determine the actual state of the globe, but also to trace its past history through that succession of ages, in which the matter composing it has probably passed gradually through all the stages between a simple elementary state and that in which it has become adapted to the habitation of man. In this point of view the author conceives the problem he proposes is not without value, as demonstrating an important fact in the history of the earth, presuming its solidification to have begun at the surface; namely, the permanence of the inclination of its axis of rotation, from the epoch of the first formation of an exterior crust. This permanence has frequently been insisted on, and is highly important as connected with the speculations of the author on the causes of that change of temperature which has probably taken place in the higher latitudes: all previous proofs of this fact having rested on the assumption of the earth's entire solidity; an assumption which, whatever may be the actual state of our planet, can never be admitted as applicable to it at all past epochs of time, at which it may have been the habitation of animate beings.

The author concludes, by expressing a hope that he may be enabled to prosecute the inquiry still further, and to bring before the Royal Society, at a future time, the matured results of his speculations.

March 14, 1839.

JOHN W. LUBBOCK, Esq., Vice-President and Treas., in the Chair.

G. W. Featherstonhaugh, Esq., who at the last Anniversary had ceased to be a Fellow from the non-payment of his annual contribution, was, at this Meeting, re-admitted by ballot into the Society, agreeably to the provision of the Statutes.

Clement Tudway Swanston, Esq., was balloted for, and duly elected into the Society.

A paper was read, entitled, "An Experimental Inquiry into the

Formation of Alkaline and Earthy Bodies, with reference to their presence in Plants, the Influence of Carbonic Acid in their generation, and the equilibrium of this gas in the atmosphere." By Robert Rigg, Esq. Communicated by the Rev. J. B. Reade, M,A., F.R.S.

The object of the author, in the present memoir, is to show that the solid materials which compose the residual matter in the analysis of vegetable substances, and which consist of alkaline and earthy bodies, are actually formed during the process of fermentation, whether that process be excited artificially, by the addition of a small quantity of yeast to fermentable mixtures, or take place naturally in the course of vegetation, or of spontaneous decomposition. His experiments also tend to show that this formation of alkaline and earthy bodies is always preceded by the absorption of carbonic acid, whether that acid be naturally formed or artificially supplied. He finds, also, that different kinds of garden mould, some being calcareous, others siliceous, and others aluminous, exposed in retorts to atmospheres consisting of a mixture of carbonic acid gas and common air, absorb large quantities of the former, combining with it in such a manner as not to afford any traces of this carbonic acid being disengaged by the action of other acids. He considers the result of this combination to be the formation of an alkaline body, and also of a colouring matter. This combination takes place to a greater extent during the night than during the day; and in general, the absorption of carbonic acid by the soil is greatest in proportion as it is more abundantly produced by the processes of vegetation; and conversely, it is least at the time when plants decompose this gas, appropriating its basis to the purposes of their own system. Hence he conceives that there is established in nature a remarkable compensating provision, which regulates the quantity of carbonic acid in the atmosphere, and renders its proportion constant.

A paper was also read, entitled, "Note on the Art of Photography, or the application of the Chemical Rays of Light to the purposes of Pictorial Representation." By Sir John F. W. Herschel, Bart., K.H., V.P.R.S., &c.

The author states that his attention was first called to the subject of M. Daguerre's concealed photographic processes, by a note from Captain Beaufort, dated the 22nd of January last, at which time he was ignorant that it had been considered by Mr. Talbot, or by any one in this country. As an enigma to be solved, a variety of processes at once presented themselves, of which the most promising are the following; 1st, the so-called de-oxidizing power of the chemical rays in their action on recently precipitated chloride of silver; 2ndly, the instant and copious precipitation of a mixture of a solution of muriate of platina and lime-water by solar light, forming an insoluble compound, which might afterwards be blackened by a variety of agents; 3rdly, the reduction of gold in contact with deoxidizing agents; and, 4thly, the decomposition of an argentine compound soluble in water, exposed to light in an atmosphere of peroxide of chlorine, either pure or dilated.

Confining his attention, in the present notice, to the employment of chloride of silver, the author inquires into the methods by which the blackened traces can be preserved, which may be effected, he observes, by the application of any liquid capable of dissolving and washing off the unchanged chloride, but of leaving the reduced, or oxide of silver, untouched. These conditions are best fulfilled by the liquid hyposulphites. Pure water will fix the photograph, by washing out the nitrate of silver, but the tint of the picture resulting is brick-red; but the black colour may be restored by washing it over with a weak solution of hyposulphite of ammonia.

The author found that paper impregnated with the chloride of silver was only slightly susceptible to the influence of light: but an accidental observation led him to the discovery of other salts of silver, in which the acid being more volatile, adheres to the base by a weak affinity, and which impart much greater sensibility to the paper on which they are applied: such as the carbonate, the nitrate, and the acetate. The nitrate requires to be perfectly neutral; for the least excess of acid lowers in a remarkable degree its susceptibility.

In the application of photographic processes to the copying of engravings or drawings, many precautions, and minute attention to a number of apparently trivial, but really important circumstances, are required to ensure success. In the first tranfers, both light and shadow, as well as right and left, are the reverse of the original: and to operate a second transfer, or by a double inversion to reproduce the original effect, is a matter of infinitely greater difficulty; and in which the author has only recently ascertained the cause of former failures, and the remedy to be applied.

It was during the prosecution of these experiments that the author was led to notice some remarkable facts relating to the action of the chemical rays. He ascertained that, contrary to the prevailing opinion, the chemical action of light is by no means proportional to the quantity of violet rays transmitted, or even to the general tendency of the tint to the violet end of the spectrum: and his experiments lead to the conclusion that, in the same manner as media have been ascertained to have relations *sui generis* to the calorific rays, not regulated by their relations to the rays of illumination and of colour, they have also specific relations to the chemical spectrum, different from those they bear to the other kinds of spectra. For the successful prosecution of this curious investigation, the first step must consist in the minute examination of the chemical actions of all the parts of a pure spectrum, not formed by material prisms, and he points out, for that purpose, one formed in Fraunhofer's method, by the interference of the rays of light themselves in passing through gratings, and fixed by the heliostat.

He notices a curious phenomenon respecting the action of light on nitrated paper; namely, its great increase of intensity, under a certain kind of glass strongly pressed in contact with it; an effect which cannot be explained either by the reflection of light, or the presence of moisture; but which may possibly be dependent on the evolution of heat.

Twenty-three specimens of photographs, made by Sir John Herschel, accompany this paper: one, a sketch of his telescope at Slough, fixed from its image in a lens; and the rest copies of engravings and drawings, some reverse, or first transfers; and others second transfers or re-reversed pictures.

March 21, 1839.

The MARQUIS of NORTHAMPTON, President, in the Chair.

Thomas William Fletcher, Esq., and the Rev. Thomas Gaskin, were balloted for, and duly elected into the Society.

The following papers were read:—

I. "Description of a Compensating Barometer, adapted to Meteorological purposes, and requiring no corrections either for Zero, or for Temperature." By Samuel B. Howlett, Esq., Chief Military Draftsman, Ordnance. Communicated by Sir John F. W. Herschel, Bart., K.H., V.P.R.S., &c.

In the instrument here described, there is provided, in addition to the ordinary barometric tube (inverted, in the usual way, in a cistern of mercury,) a second tube of the same dimensions, placed by the side of the former, and likewise filled with mercury, but only to the height of twenty-eight inches above the level of the mercury of the cistern. This tube is closed at its lower end, and fixed to a float supported by the mercury in the cistern: and it bears, at its upper end, an ivory scale, three inches in length. The elevation of the mercury in the barometric tube is estimated by the difference between its level and that of the mercury in the closed tube; and is measured on the ivory scale by the aid of a horizontal index, embracing both the tubes, and sliding vertically along them. As the float which bears the closed tube, to which the scale is attached, rests freely on the mercury in the cistern, and consequently always adjusts itself to the level of that fluid, no correction for the zero point is needed; and as every change of temperature must similarly affect the columns of mercury in both the tubes, after the scale has been adjusted so as to read correctly at any given temperature, such as 32°, which may be effected by comparison with a standard barometer, every other reading will correspond to the same temperature, and will require no correction. The author considers the error arising from the difference of expansion corresponding to the different lengths of the two columns of mercury, and which will rarely amount to one four-hundredth of an inch, as too small to deserve attention in practice, being, in fact, far within the limits of error in ordinary observations.

Subjoined to the above paper is a letter from the author to Sir John Herschel, containing a statement of comparative observations made with a mountain barometer, and with the compensation barometer, from which it appears that the use of the latter is attended with the saving of a great quantity of troublesome calculation. The comparative observations are given in a table, exhibiting a range of differences from +·012 to —·016 of an inch.

II. " An Account of the fall of a Meteoric Stone in the Cold Bokkeveld, Cape of Good Hope." By Thomas Maclean, Esq., F.R.S., &c., in a letter to Sir John F. W. Herschel, Bart., V.P.R.S., and communicated by him.

The appearance attending the fall of this aerolite, which happened at half-past nine o'clock in the morning of the 13th of October, 1838, was that of a meteor of a silvery hue, traversing the atmosphere, for a distance of about sixty miles, and then exploding with a loud noise, like that from artillery, which was heard over an area of more than seventy miles in diameter; the air at the time being calm and sultry. The fragments were widely dispersed; and were at first so soft as to admit of being cut with a knife; but they afterwards spontaneously hardened. The entire mass of the aerolite is estimated at about five cubic feet.

III. " Chemical Account of the Cold Bokkeveld Meteoric Stone." By Michael Faraday, Esq., D.C.L., F.R.S., &c., in a letter to Sir John F. W. Herschel, Bart., V.P.R.S., &c., and communicated by him.

The stone is stated as being soft, porous, and hygrometric; having when dry, the specific gravity of 2·94; and possessing a very small degree of magnetic power irregularly dispersed through it. One hundred parts of the stone, in its natural state, was found to consist of the following constituents; namely,

Water	6·5	Alumina	5·22
Sulphur	4·24	Lime	1·64
Silica	28·9	Oxide of Nickel	·82
Protoxide of Iron	33·22	Oxide of Chromium	·7
Magnesia	19·2	Cobalt and Soda	a trace.

IV. " Note respecting a new kind of Sensitive Paper." By Henry Fox Talbot, Esq., F.R.S.

The method of preparing the paper here referred to consists in washing it over with nitrate of silver, then with bromide of potassium, and afterwards again with nitrate of silver; drying it at the fire after each operation. This paper is very sensitive to the light of the clouds, and even to the feeblest daylight.

The author supplies an omission in his former memoir on photogenic drawing, by mentioning a method he had invented and practised nearly five years ago, of imitating etchings on copper plate, by smearing over a sheet of glass with a solution of resin in turpentine, and blackening it by the smoke of a candle. On this blackened surface a design is made with the point of a needle, the lines of which will of course be transparent, and will be represented by dark lines on the prepared paper to which it is applied, when exposed to sunshine. The same principle may be applied to make numerous copies of any writing.

The Society then adjourned over the Easter Recess, to meet again on the 11th of April next.